

REMARKS

Re-examination and allowance of the present application is respectfully requested.

In the Office Action mailed on March 1, 2004, the Examiner objects to the incorporation by reference of Japanese priority Application No. 11-150544. By the current amendment, Applicant deletes reference to the priority document in the specification. In view of the current amendment to the specification, Applicant submits that the ground for the objection to the specification no longer exists, and respectfully requests withdrawal of this objection.

Applicant respectfully traverses the various 35 U.S.C. §103(a) rejections of originally filed claims 1-9. According to a feature of the present invention, discussed at, for example, page 19, line 25 through page 22, line 6 of Applicant's specification, the period of the charge pumping operation is shortened (made smaller) as the accumulating period increases (is made larger). In particular, the specification discloses that a time interval " t_{pi} " is calculated in accordance with an accumulating period " t_e " and an ambient temperature " T_c " of CCD 30 (see, for example, page 20, line 25 through page 21, line 7 of Applicant's specification). By controlling the time interval of the charge pumping operation to be short when the accumulating period is long, the amount of unwanted charge remaining in the photo-diode of the CCD 30 becomes small (see, for example, page 22, lines 3-6 of Applicant's specification). Applicant submits that at least this feature is lacking from the prior art combination applied by the Examiner.

Applicant submits that U.S. Patent 4,679,212 to HYNECEK is silent with respect to disclosing or suggesting that the generation of an unwanted charge is minimized by decreasing (e.g., making shorter) the period of the charge pumping operation as the accumulating period becomes longer.

In setting forth this rejection, the Examiner refers Applicant to Fig. 10 and equation 8 of HYNECEK, as disclosing that the number of full well exposures that can be handled increases as the exposure time increases. The Examiner then proceeds to formulate functions $N(t,T)$ from function $E(t,f)$ (corresponding to equation 8 in HYNECEK) to support his position that when the function $N(t,T)$ exceeds the function $E(t,f)$, blooming will occur, and that one skilled in the art would recognize to increase the clock frequency of the second electrode to offset the increased noise.

Applicant respectfully disagrees with the Examiner's position. Applicant submits that the Examiner is employing impermissible hindsight in an attempt to reject the claims of Applicant's invention. HYNECEK is directed to preventing blooming from unwanted electric charges, but does not disclose or even suggest the relationship advanced by the Examiner (e.g., the relationship between $E(t,f)$ and $N(t,T)$) to conclude that it would be desirable to control the time interval of a charge pumping operation to be short when the accumulating period is long in order to make the amount of an unwanted charge small.

Applicant further submits that the teachings of U.S. Patent 5,339,162 to TANI, and/or U.S. Patent 4,703,442 to LEVINE, and/or Applicant's "admitted" prior art also fail

to disclose/suggest that which is lacking in HYNECEK. TANI discloses a device that obtains an electronic charge accumulation period. LEVINE discloses detecting a temperature of a CCD. Page 2, lines 6-14 of Applicant's specification discloses a problem with prior art CCD device, but presents no solution to the problem. Applicant submits that none of the references, whether considered alone or in the combinations suggested by the Examiner, suggest changing the period of the charge pumping operation to become shorter as the accumulating period becomes longer.

By the current amendment, Applicant amends independent claims 1 and 9 to clarify that the voltage control processor shortens a period by which the voltage level of the second electrode is periodically changed as the accumulating period increases. As at least this feature is neither disclosed or suggested, Applicant submits that the amended claims are distinguishable over the applied art. Accordingly, the Examiner is respectfully requested to withdraw the 35 U.S.C. §103 rejections, and to indicate the allowability of the pending claims.

Applicant also submits new claims 10-12 for the Examiner's consideration. New independent claim 10 specifies an apparatus for driving an imaging device, in which an accumulator accumulates a period of an imaging device having a light receiving element with a first electrode and a second electrode, and a voltage controller controls a voltage level of the first electrode and the second electrode during the accumulating period, with the accumulating period being inversely related to a period of a charge pumping operation. New

dependent claims 11 and 12 further define the operation of the voltage controller. Applicant submits that these claims are allowable for at least the reasons applicable to claims 1-6, 8 and 9; namely, that the accumulating period is increased as a period of a charge pumping operation is reduced (e.g., inverse relationship). Accordingly, the Examiner is respectfully requested to indicate the allowability of the newly added claims.

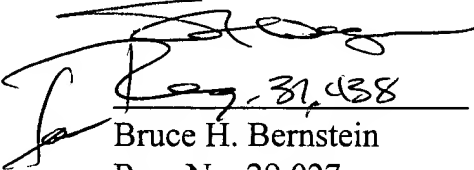
SUMMARY AND CONCLUSION

In view of the fact that none of the art of record, whether considered alone or in combination, discloses or suggests the present invention as now defined by the pending claims, and in further view of the above amendments and remarks, reconsideration of the Examiner's action and allowance of the present application are respectfully requested and are believed to be appropriate.

Should the Commissioner determine that an extension of time is required in order to render this response timely and/or complete, a formal request for an extension of time, under 37 C.F.R. §1.136(a), is herewith made in an amount equal to the time period required to render this response timely and/or complete. The Commissioner is authorized to charge any required extension of time fee under 37 C.F.R. §1.17 to Deposit Account No. 19-0089.

If there should be any questions concerning this application, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,
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